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Double nuclear magnetic resonance and crystal chemistry at the lattice positions of diamagnetic atoms, both structural, and foreign

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Abstract

Double nuclear magnetic resonance (DNMR) with Jeener's pulsed sequence on proton and fluorine frequencies was used to investigate the electric quadrupole interactions of (i) ^{23}Na in Na2Cd(SO4)2·2H2O, $B2^0$=±218.5±1 kHz, $B2^2$=±98±5 kHz, (ii) of ^{23}Na, which enter the crystal, CaF2: Na^+ (0.07 wt. %) $B2^0$=±85.7±0.5 kHz, trigonal position, and (iii) ^{23}Na which are near the foreign atom in NaF:Ca^{2+} (0.02 wt.%) $B2^0$=±86.7±0.5 kHz, tetragonal position. Some details of DNMR experiments are analyzed. The conditions for maximum transfer of a Zeeman energy to a dipole-dipole reservoir are described for multispin systems and some crystal hydrates. The angular dependence of the Hamiltonian containing the spherical tensor operators of second rank was obtained for all possible orientations of a local coordinate system relative to a laboratory system. © 1980 Springer-Verlag.

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